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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Moon-Sook Lee

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EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT

PAPER NUMBER

1792

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/784,772	Applicant(s) LEE ET AL.	
	Examiner Jeffrie R. Lund	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-13,15-17,34 and 35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-13,15,34 and 35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the teaching that a portion of the heating pipe 250 is in the same plane as the susceptor 220 is not supported by the specification. The limitation is supported in figure 2 as argued in the paper mailed March 5, 2008, however, this limitation or description is not found in the specification. Therefore, the limitation or description must be added to the specification.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1, 3, 8, 10, 11 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al, US Patent 6,007,633, in view of Sakamoto et al, US Patent 5,968,593.

Kitamura et al teaches an apparatus for fabricating a semiconductor device that includes: a process chamber 21; a susceptor 30 including a heater 35 and supporting a wafer W disposed within the process chamber; a shower part 52 disposed to face the susceptor; a first supply pipe 71 for supplying a first gas; and a heating pipe 60, 61 for heating the first gas. The heating pipes 60, 61 are connected with the supply pipes 71 and the shower part 52; is inside the processing chamber 100 (disposed between the outer wall and the susceptor); surrounds the susceptor; and is heated by radiation from the susceptor.

Kitamura et al differs from the present invention in that Kitamura et al does not teach that the heating pipe coils in helix or spiral coil along the bottom (second part) with a part of the heating pipe in the same plane as the susceptor; sidewall (first part), and top (third part) of the processing chamber; a liner between the susceptor and the heating pipe; or a second gas inlet.

Sakamoto et al teaches an apparatus for fabricating a semiconductor device that includes: a process chamber 100; a susceptor (wafer 200 on boat 212) disposed within the process chamber; a shower part 32, 40, and 42 disposed to face the susceptor; a first supply pipe 91 for supplying a first gas; a second supply pipe 92 for supplying a second gas; a heating pipe 311 for heating the first gas; a second heating pipe 312 for heating a second gas; and a liner 10 between the heating pipe and the susceptor. The

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heating pipes are: connected with the supply pipes 91, 92 and the shower part 32, 40, 42; is inside the processing chamber 100; includes a helically coiled shaped part coiled around the circumference of the susceptor from the a lower portion of the sidewall to the upper portion of the sidewall of the process chamber and with a part of the heating pipe in the same plane as the susceptor; a spiral coil in the top part; and is heated by radiation from the susceptor.

The motivation for forming coils along the sides of the processing chamber is to extent the length of the heating pipe to extend the time in which the gas is preheated which results in the gas being heated to a more uniform temperature as taught by Sakamoto et al.

The motivation for adding the liner of Sakamoto et al between the susceptor and the gas inlet of Kitamura et al is to remove the heating pipe from the processing chamber environment as taught by Sakamoto et al.

The motivation for adding the second gas inlet of Sakamoto et al to the apparatus of Kitamura et al is to provide a second gas to the processing chamber.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kitamura et al by: making the heating pipe with a helical coil along the side wall, and spiral coils along the top and bottom walls; adding a liner; and adding a second gas inlet as taught by Sakamoto et al.

5. Claims 4-7, 9 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al and Sakamoto et al, as applied to claims 1, 3, 8, 10, and 11 above, and further in view of Shim et al, US Patent Application Publication 2003/0041804 A1.

Kitamura et al and Sakamoto et al differs from the present invention in that they do not teach that the heating pipe coils are in the outer wall of the chamber.

Shim et al teaches an apparatus in which the heating pipe 130 is inside the outer wall of the chamber.

The motivation for placing the tubes of Kitamura et al and Sakamoto et al in the outer wall of the chamber is to remove the heating pipe from the processing chamber environment as taught by Shim et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made place the heating pipes of Kitamura et al and Sakamoto et al in the outer wall as taught by Shim et al.

6. Claims 12, 13, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al and Sakamoto et al, as applied to claims 1, 3, 8, 10, and 11 above, and further in view of Shinriki et al, US Patent 6,800,139 B1.

Kitamura et al and Sakamoto et al differ from the present invention in that they do not teach a MOCVD apparatus, the first gas is an oxygen gas supplied at room temperature, the second gas is a heated gas containing Pb, Zr and Ti for depositing a ferroelectric layer, or that the first gas flows into a first part of the shower and the second gas flows into a second part of the shower, separated from the first part.

Shinriki et al teaches an MOCVD apparatus for depositing a PZT ferroelectric layer that includes: a shower part 50; a first supply pipe 80 for supplying an oxygen gas (NO_2) at room temperature to a first shower part 58A-58C; a second gas supply pipe 62, 66 for supplying a heated metal organic gas containing Pb, Zr and Ti (column 7 lines

29-46) to a second part 56A, 56B, not connected to the first part. (Entire document, specifically, figures 1 and 3)

The motivation for replacing the gas sources and shower of Kitamura et al and Sakamoto et al with the gas sources with heated gas line and shower of Shinriki et al is to enable the apparatus of Kitamura et al and Sakamoto et al to deposit a PZT ferroelectric layer as taught by Shinriki et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the gas sources and shower of Kitamura et al and Sakamoto et al with the gas sources with headed gas line and shower of Shinriki et al.

Response to Arguments

7. Applicant's arguments, see paragraphs entitled "Rejections under 35 U.S.C. § 102", filed March 5, 2008, with respect to the 102 rejection have been fully considered and are persuasive. The 102 rejection of claims has been withdrawn.

8. Applicant's arguments filed March 5, 2008 have been fully considered but they are not persuasive.

Regarding the arguments directed to the 103 rejections, the Examiner disagrees for the following reasons:

a) The number of wafers is not material to the problem being solved. A apparatus for processing a plurality of wafers is also capable of processing a single wafer.

"Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "Inclusion of material or

article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Thus, the number of wafers processed does not limit or prevent the combination of elements from Kitamura et al and Sakamoto et al.

b) The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Sakamoto et al clearly suggests spiral and helix shaped coils for preheating processing gases.

c) Kitamura et al and Sakamoto et al both are directed to problem of preheating the precursor gases. Thus they are not isolated teachings but directed to the same problem and are combinable.

9. Due to work flow requirements, the Examiner was unable to contact the Applicant. The Examiner apologizes for not contacting the Applicant as requested, and invites the Applicant to call and set up an interview to discuss the case, if Applicant so desires.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (10:00 am - 9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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/Jeffrie R. Lund/
Primary Examiner
Art Unit 1792

JRL
7/5/08